

given in NATURE, vol. xlii. p. 370, upon the remarkable compound of nickel and carbon monoxide, $\text{Ni}(\text{CO})_4$. He finds that it is a most highly poisonous substance, far more deadly than carbon monoxide itself. Blood poisoned by means of it exhibits the characteristic absorption-spectrum of blood containing carbon monoxide. The oxygen of the air diminishes somewhat the poisonous action of the compound, owing to the fact that it rapidly promotes dissociation into metallic nickel and carbon monoxide.

THE mineral hornblende has been artificially reproduced in well-formed crystals by M. Kroustchoff, and an account of his experiments is communicated to the current number of the *Comptes rendus*. The last few years have been most fruitful in mineral syntheses, so much so indeed that there remain very few of the more commonly occurring rock-forming minerals which have not been artificially prepared in the laboratory. M. Kroustchoff, who not long ago described a mode of preparing most perfect crystals of quartz, has made many attempts to reproduce hornblende, and has at length succeeded by the adoption of the following somewhat remarkable process. This process essentially consists in digesting together for a long period of time, *in vacuo*, and at a high temperature, the various oxides contained in natural hornblende amphiboles, in presence of water. Small flasks of green glass were employed, each of which was exhausted by means of a Sprengel pump after the introduction of the substances to be digested together. The ingredients digested consisted of (1) a dialyzed three per cent. aqueous solution of silica; (2) an aqueous solution of alumina obtained by dissolving aluminium hydrate in an aqueous solution of aluminium chloride and subjecting the solution to dialysis; (3) an aqueous solution of ferric oxide obtained by the addition of ammonium carbonate to ferric chloride in such quantity as to redissolve the precipitate first formed, and dialyzing the solution; (4) carefully prepared pure ferrous hydrate; (5) lime water; (6) freshly precipitated hydrate of magnesia; and (7) a few drops of caustic soda and potash. The mixture presented the appearance of a gelatinous mud. The exhausted and sealed flasks were placed in a specially constructed iron many-chambered furnace, and heated for three months to a temperature of 550°C . At the expiration of this time the appearance of the contents had entirely changed, having become much darker in colour, and distributed throughout were numerous brilliant little crystals, almost black in colour, and reminding one forcibly of natural hornblende. On systematic examination they were found to consist of flattened prisms identical in character with hornblende. Under the microscope they exhibited the hornblende yellowish-green colour and pleochroism. Their index of refraction was the same as that of natural hornblende, about 1.65. The angle between their optic axes was found to be 82° ; that of natural crystals varies from 80° to 85° . Analyses gave the characteristic amphibolic percentages, that of SiO_2 being 42.3. In addition to these crystals of hornblende it is interesting to note that pyroxenic crystals resembling those of the augite family were also found in the flasks, together with crystals of a zeolite and of a variety of orthoclase felspar. And finally, some exquisite little quartz crystals were observed, showing cavities containing liquids and bubbles resembling those of natural rock crystals.

THE additions to the Zoological Society's Gardens during the past week include an Arctic Fox (*Canis lagopus*) from Iceland, presented by Mr. H. Sacheverell Bateman; a Squirrel-like Phalanger (*Belidens sciureus* δ) from North Australia, presented by Mrs. FitzGerald; a Lacertine Snake (*Colepeltis laceratina*), South European, presented by Mr. J. C. Warburg; a Rhesus Monkey (*Macacus rhesus* δ) from India; a Common Wolf (*Canis lupus* δ), European, deposited; two Violaceous Plantain Cutters (*Musophaga violacea*) from West Africa, four

Cape Colys (*Colius capensis*) from South Africa, a Carpet Snake (*Morelia variegata*) from Australia, purchased; a Collared Fruit Bat (*Cynonycteris collaris*), a Vulpine Phalanger (*Phalangista vulpina* δ), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

STARS HAVING PECULIAR SPECTRA.—*Astronomische Nachrichten*, No. 3025, contains a note entitled "A Fifth Type of Stellar Spectra," by Prof. E. C. Pickering, and one by Mrs. Fleming, in which she describes the following objects of interest, discovered during an examination of the photographs of stellar spectra taken at Harvard College Observatory with the 8-inch Draper telescope:—

Designation.	R.A. 1900.	Decl. 1900.	Mag.	Description of spectrum
D.M. + $63^\circ 83'$...	h. m. 0 37.5	+ $64^\circ 14'$	9.5	Bright lines.
Cord. G.C. 23416	17 12.1	- $45^\circ 32'$	7.2	
[Aquarius]	20 41.2	- $4^\circ 26'$	Var.	III. "Type"; G and λ bright.
[Delphinus]	20 43.1	+ $18^\circ 58'$	Var.	" " "

The similarity of the spectra of the two stars in Aquarius and in Delphinus to that commonly shown by variables of long period led Mrs. Fleming to suspect the variability, which was confirmed by an examination of photographs taken on various dates. With respect to this point, Prof. Pickering remarks, in the note to which reference has already been made:—"Probably most of the variable stars of long period give a spectrum resembling that of α Ceti, and having the hydrogen lines G, λ , α , β , γ , and δ bright about the time of maximum. When the photographic spectrum is faint, only the brighter lines G and λ are visible. Photographs have been obtained of forty-one of these objects, ten of which have been discovered by means of this peculiarity of their spectrum."

Following the classification suggested by Prof. Lockyer in the Bakerian lecture for 1888, spectra of Secchi's third type are divided into sub-groups, of which α Orionis, α Herculis, S.D. - $2^\circ 36'53$, and α Ceti, are given as examples.

The fifth type of stellar spectra which Prof. Pickering proposes to establish will contain planetary nebulae and bright-line stars, and is therefore equivalent to Lockyer's Group I. Photographs of the spectra of sixteen planetary nebulae taken at Harvard resemble each other closely, and consist mainly of bright lines and bands. The bright-line stars are divided into three classes, in the first and second of which $\lambda 469$ is the most conspicuous line, whilst the third class is distinguished by the distinctness of a line at $\lambda 464$. A comparison shows that the position of the lines of these stars and planetary nebulae is the same as in Orion stars, but the lines are dark instead of bright in the last-named bodies. Only a three-figure reference is now given to the positions of the lines, and more precise measures of wave-length will be required to show whether the slight differences which exist are real or not. The irregular distribution of these objects in the heavens is another point of resemblance. Four-fifths of the stars of the Orion type are found in the Milky Way. A similar distribution of the planetary nebulae has long been recognized. By arranging thirty-three bright-line stars according to their distances from the pole of the Milky Way (R.A. 12h. 40m., Decl. + 28°), and its ascending node (R.A. 18h. 40m., Decl. 0°), Prof. Pickering shows that their distribution is also strikingly irregular. The average value of the galactic latitude of all the stars is $2^\circ 6'$. Groups occur in Argo, Scorpio, and Cygnus. The approximate longitudes are 257° , 313° , and 42° . The number of stars in these groups is 7, 5, and 8, or 20 in all. Each group is included in a circle $8'$ in diameter, and of all the members only three are isolated, being distant 10° or more from any of the others. It therefore follows that one half of the known bright-line stars are included in an area of about one three-hundredth of the entire sky. It is gratifying to find the suggestion, that stars with bright lines are physically similar to planetary nebulae, supported by the numerous observations made at Harvard College Observatory. The anomalous character of the spectra of the Orion stars has long been a matter of discussion. Perhaps the agreement as to position of the dark lines in these stars with the bright lines in others will enable their place in stellar evolution to be determined.

THE NEBULA NEAR MEROPE.—In *Astronomische Nachrichten*, No. 3024, Prof. Pritchard states that the nebula close south and following Merope, which Prof. Barnard observed on November 14, and announced as a discovery in *Astr. Nach.*, No. 3018, is plainly impressed on photographic plates taken at Oxford Observatory, with exposures varying from 20 to 120 minutes. Prof. Barnard believed that the exposure which would be necessary to produce an image of the nebula would so extend the diameter of the image of Merope that the two objects would coalesce. Prof. Pritchard, however, finds that stars of the 14th magnitude are perfectly distinct on plates taken with the above-mentioned exposures, and that the stellar disks of Merope in such cases vary from 20" to 30' in diameter. Since the supposed new nebula is some 40" distant from Merope, the separation of the two objects is always plainly marked.

COMET α 1891.—The comet of which Mr. Denning announced the discovery in the last issue of NATURE (p. 516) is probably identical with one independently discovered by Prof. Barnard, of Lick Observatory, on Tuesday, March 31.

BIOLOGICAL NOTES.

THE EYES IN BLIND CRAYFISHES.—The minute structure of the eyes of two species of blind crayfish have been very thoroughly investigated by G. H. Parker, under the direction of Prof. Mark. Mr. Parker is the Instructor in Zoology at the Harvard College Museum. The species were *Cambarus setosus*, a new species recently described by Dr. Walter Faxon, from caves in South-western Missouri, and *C. pellucidus*, Tellk., the well-known species from Mammoth Cave. After a short *résumé* of the investigations of Newport and Leydig, the author states that the principal questions concerning the eyes of blind crayfishes turn on their amount of degeneration; not only has the finer structure of the retina been affected, but the shape of the optic stalks has been altered. The optic stalks are not only proportionally smaller than those of crayfishes possessing functional eyes, but they have in these two cases characteristically different shapes. In crayfishes with fully developed eyes the stalk is terminated distally by a hemispherical enlargement; in the blind crayfishes it ends as a blunt cone. In both forms of crayfishes the optic ganglion and nerve were present, the latter terminating in some way undiscoverable in the hypodermis of the retinal region. In *C. setosus* this region is represented only by undifferentiated hypodermis, composed of somewhat crowded cells, while in *C. pellucidus* it has the form of a lenticular thickening of the hypodermis, in which there exists multinuclear granulated bodies; these are shown to be degenerated clusters of cone-cells. (*Bulletin of the Museum of Comparative Anatomy at Harvard College*, vol. xx. No. 5, November 1890.)

A NEW STALKED CRINOID.—The United States Acting Fish Commissioner was engaged during 1887 in dredging operations between Panama and the Galapagos Islands. One haul, taken from a depth of 392 fathoms, off Indefatigable Island, one of the Galapagos group, brought up three imperfect specimens of a most interesting stalked Crinoid. At a first glance, it might readily pass for a living representative of the fossil *Apiocrinus*; but on a closer scrutiny it showed some features which ally it with *Millericrinus*, and others with *Hyocrinus* and *Rhizocrinus*. Prof. Alexander Agassiz, who hopes very soon to publish a detailed account of this form, with figures, thinks that it shows structural features of all the above mentioned genera. It has, like *Hyocrinus* and *Rhizocrinus*, only five arms; they are, however, not simple, but send off, from the main stem of each arm, three branches to one side and two to the other. The system of interradial plates is highly developed, as in *Apiocrinus* and *Millericrinus*, six rows of solid polygonal imperforate plates being closely joined together, and uniting the arms into a stiff calyx as far as the sixth or seventh radial and to the third or fourth joints of the first and second pinnules. The interradial calycinal plates extend along the arms for a considerable distance beyond the first branch. The stem tapers very gradually, and in its general appearance recalled that of *Apiocrinus*; it expanded towards the base, but the actual attachment was not found. The stem must have been about from 26 to 27 inches in height; the height of the calyx to the interradials is $7/16$ of an inch; its diameter at the inner base of the second radials is $11/16$ of an inch, and at the height of the third joint of the second pinnule 1 inch. The arms were about 8 inches in length. It is named *Calamocrinus diomeda*, after the steamer *Albatross*.

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BRITISH MARINE ALGÆ.—Almost forty years have passed since the issue of the last part of Harvey's "Phycologia Britannica." The publication of this work extended over five years, and it enumerates 388 species. In the preface to the first volume the author not obscurely hints at the existence of other forms, "some few but distinct looking, preserved in my own and other herbaria," remaining over for further research; but the time for this never came. During the years that have elapsed since 1851, though the labourers in this field of botany do not appear to have greatly increased, the methods of modern research have added to our exact knowledge of the subject, and the investigations of Agardh, Bornet, Flahault, Gomont, Grunow, Schmitz, Reinke, and others, have thrown a flood of light on the minute structure, fructification, and classification of the species of this group. Although the time has not yet, in our opinion, come for a new edition of Harvey's work, yet it is with extreme satisfaction that we notice the publication of "a revised list" of our British marine Algæ, which is the result of the joint labours of Messrs. E. M. Holmes and E. A. L. Batters. None but those who have engaged in such work can appreciate the immense amount of labour and care which is needed to bring such a list even fairly up to date, and when, as in the present instance, most of the additions to the known native species have been made by the individual efforts in collecting of the authors, it must add to the appreciation with which this revised list will be received by botanists. As a matter of necessity, for the present, any classification must be regarded as only provisional, but the authors have been enabled to give the very best one possible, and one quite in accordance with recent investigations. Exclusive of all varieties, the number of species recorded in this revised list is 536, after excluding some six forms, like *Sargassum bacciferum* and *S. vulgare*, which have only been met with as waifs. In the classification of the Cyanophyceæ, the authors have as to the Nostochinæ followed, with few exceptions, the guiding of Bornet, Flahault, and Gomont. In the Chlorophyceæ, while the researches of Agardh and Wille have not been overlooked, yet it can scarcely be doubted but that much new work is needed ere the numerous species of *Chaetomorpha* and *Cladophora* can be satisfactorily described or arranged. Reinke has been in part followed in the arrangement of the Phæophyceæ, but in some orders of this group a good deal of additional information is needed ere a generally acceptable determination of even the limits of its genera is obtained. In the Rhodophyceæ the classification of Schmitz has been generally adopted, but we still wait expectingly for the final views of Schmitz on the group. In the working out of the details a great deal of trouble has been taken in the determination of the often very numerous varieties, and this will be an important help to the worker. An attempt has been made to give a general idea of the geographical distribution by dividing the coast-line of Great Britain and Ireland into fourteen sections, and then indicating in which of these the species or its varieties are or have been found. In an appendix a list of species known to occur either on the Atlantic shores of France or of Norway, or in the Baltic, and which one might expect to meet with on our own shores, is given, and will prove useful. Possibly Mediterranean forms may yet be met with, other than waifs, on the south-west shore of Ireland, a part of the coast-line hardly as yet investigated. Miss Hutchins collected in portions of Bantry Bay, and Miss Ball in the Youghal district, but the intervening coast has only as yet been casually visited. It is to be hoped and expected that one result of the publication of this most useful list will be to stir up enthusiasm in the collecting and study of our native species. This list appears in the *Annals of Botany* for December 1890.

COMPARATIVE ZOOLOGY MUSEUM, HARVARD.—The Annual Report of the Curator for the session 1889-90 has just reached us, and like all the annual reports from the pen of Alexander Agassiz it is full of interest. The geological section of the Museum, containing the exhibition-rooms and additional laboratories of the department, is now ready for use. On the first floor it contains a large lecture-room, capable of seating 320 students. On the second floor are placed the petrographical laboratories, one for general use, the other for advanced students. In the basement are the chemical laboratories, photographic rooms, &c.; while on a fourth floor are laboratories for the physical geography department. A view of the University Museum, as seen facing the north-west corner, including the newly erected mineralogical sections, is given. On the very evident ground of safety to the collections it has been arranged